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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 09/601,234 | 10/30/2000 | Kenichi Morigaki | MAT-799US | 8757 |

7590 12/04/2003

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| EXAMINER | |
|---|---|
| TSANG FOSTER, SUSY N | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1745 | |

DATE MAILED: 12/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/601,234 | MORIGAKI ET AL. | |
| | Examiner | Art Unit | |
| | Susy N Tsang-Foster | 1745 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *11 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) *16* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15 and 17-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *21*.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

## DETAILED ACTION

### *Response to Amendment*

1. This Office Action is responsive to the amendment filed on 9/11/2003. Claims 1, 8, 13, and 16 have been amended and claims 21 and 22 have been added. Claims 1-22 are pending. Since prior art could not be found for the silicon species as a component of the central portion in conjunction with a solid solution or an inter-metallic compound comprising silicon as the coating for the central portion, a search was extended for the Sn species as a component of the central portion and Pb as the additional element in the coating (applies claims 14-, 15, 17-20). Claim 16 is withdrawn from further consideration as being drawn to a nonelected species for the additional element.

Prior art could not be found for a nonaqueous electrolyte secondary battery comprising a negative electrode which comprises a plurality of composite particles wherein each composite particle comprises a central portion consisting essentially of at least one element selected from the group consisting of tin, silicon, and zinc; and a coating at least partially around the central portion; the coating comprising a solid solution or an inter-metallic compound and the solid solution or intermetallic compound comprises a) at least one element selected from the group consisting of tin, silicon, and zinc, and b) at least one additional element selected from the group consisting of group 2 elements, transition elements, group 12 elements, group 13 elements, and group 14 elements exclusive of carbon, and exclusive of the element selected from the group consisting of tin, silicon, and zinc (applies to claims 1-13, 21, and 22). However claims 1-15, and 17-22 are rejected for obviousness type-double patenting.

***Election/Restrictions***

2. Claim 16 is withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 14 and in Paper No. 16.

***Information Disclosure Statement***

3. The information disclosure statement filed on 6/26/2003 has been considered by the Examiner.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

5. Claim 14 is rejected under 35 U.S.C. 102(a) as being anticipated by the IPDL JPO Machine Translation for JP 10-092424 A.

JP 10-092424 A discloses a non-aqueous electrolyte secondary battery comprising a positive electrode and a negative electrode capable of interacting and de-intercalating lithium (see paragraphs 5 and 11 of machine translation). In particular, lithium containing composite oxides for the positive electrode are disclosed in paragraph 11 of the reference. The negative electrode includes aluminum-M alloy powder where M can be Sn (see paragraph 7 of machine

translation). The aluminum alloy can be covered by Pb-Sn (see paragraph 8 of machine translation).

A solid electrolyte serves as a separator between the positive and negative electrodes wherein the solid electrolyte can be made by mixing two or more lithium salts with polyethylene oxide which is a polyalkylene oxide to give a polymer gel electrolyte (see paragraph 12 of machine translation).

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over the IPDL JPO Machine Translation for JP 10-092424 A in view of EP 730316 A1.

JP 10-092424 A discloses all the limitations of claims 15 and 17 (see above) except that the positive electrode includes a polymer gel electrolyte and the negative electrode includes a polymer gel electrolyte and that the polymer is a polymer of vinylidene fluoride.

EP 730316 A1 teaches polyvinylidene (PVDF) homopolymer or polyvinylidene fluoride (PVDF) copolymer as the solid electrolyte material for a separator and for the positive and negative electrodes of a lithium battery with electrolyte material being present in the separator and in the electrodes (see page 13, lines 35-50) because the PVDF provides for a porous structure in the separator and in the electrodes that would increase the utilization of the active material and electrolyte material (see page 5, lines 24-29) due to enhanced electrolyte mobility

from the porous structure. The PVDF copolymer can be copolymers of vinylidene fluoride and hexafluoropropylene (see page 4, lines 30-35).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use PVDF homopolymer gel electrolyte or PVDF-HFP copolymer gel electrolyte as the polymer gel electrolyte in the battery of JP 10-092424 A because the PVDF homopolymer gel electrolyte or PVDF-HFP copolymer gel electrolyte are stable and compatible in a lithium battery environment and are conventionally used in the art. The use of these polymer gel electrolytes in the separator and in the electrodes also gives increased efficiency in the battery due to the porous structure of the polymer as taught by EP 730316 A1.

Furthermore, it would have also been obvious to one of ordinary skill in the art at the time the invention was made to use the polymer gel electrolyte in the electrodes of a lithium battery because the use of the same polymer matrix in the electrode and in the separator (solid electrolyte) ensures chemical compatibility of the polymer as a binder for the electrodes with the polymer electrolyte.

8. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over the IPDL JPO Machine Translation for JP 10-092424 A in view of EP 730316 A1 as applied to claim 15 above, and further in view of Gies et al. (USP 5,665,265).

JP 10-092424 A in combination with EP 730316 A1 (see above) discloses all the limitations of claims 19 and 20 except that the polymer gel electrolyte includes a non-woven fabric of a polyolefin polymers, and that the polymer is a copolymer of methacrylate and an ethylene oxide.

Gies et al. teaches a polymer gel electrolyte that includes a non-woven fabric of polyolefin polymers (col. 3, lines 18-60) and that the polymer gel electrolyte can be polyethylene oxide, polymethylmethacrylate and copolymers thereof.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the polymer gel electrolyte of JP 10-092424 A include a non-woven fabric of polyolefin polymers for good mechanical integrity of the electrolyte as taught by Gies et al. (see col. 2, lines 15-20).

It would have also been obvious to one of ordinary skill in the art at the time the invention was made to use a copolymer of methacrylate and an ethylene oxide as the polymer gel electrolyte in the lithium battery of JP 10-092424 A because the copolymer is capable of absorbing electrolyte species to form a gel polymer electrolyte and it is functionally equivalent to the polyethylene oxide used in the solid electrolyte of the JP 10-092424 A as taught by Gies et al. (col. 3, lines 44-58).

9. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over the IPDL JPO Machine Translation for JP 10-092424 A in view of EP 730316 A1 as applied to claim 15 above, and further in view of St. Aubyn Hubbard et al. (USP 5,460,903).

JP 10-092424 A in combination with EP 730316 A1 (see above) discloses all the limitations of claim 18 except that the polymer in the polymer gel electrolyte is a polyester polymer.

St. Aubyn Hubbard et al. teaches a polymer gel electrolyte comprising polyester polymer for a lithium battery (see abstract; col.2, lines 33-45; col. 3, lines 1-15, lines 35-41 and lines 65-

67) because polymer gel electrolytes containing polyester as the polymer provides for mechanical rigidity.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use polyester as the polymer in the polymer gel electrolyte in the battery of JP 10-092424 A because polymer gel electrolyte comprising polyester has improved mechanical stability.

10. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over the IPDL JPO Machine Translation for JP 10-092424 A in view of Iwamoto et al. (USP 5,589,296).

JP 10-092424 A discloses a non-aqueous electrolyte secondary battery comprising a positive electrode and a negative electrode capable of interacting and de-intercalating lithium (see paragraphs 5 and 11 of machine translation). In particular, lithium containing composite oxides for the positive electrode are disclosed in paragraph 11 of the reference. The negative electrode includes aluminum-M alloy powder where M can be Sn (see paragraph 7 of machine translation). The aluminum alloy can be covered by Pb-Sn (see paragraph 8 of machine translation).

A solid electrolyte serves as a separator between the positive and negative electrodes wherein the solid electrolyte can be made by mixing two or more lithium salts with polyethylene oxide which is a polyalkylene oxide to give a polymer gel electrolyte (see paragraph 12 of machine translation).

JP 10-092424 A does not disclose that the solid electrolyte is a lithium ion conductive glass solid electrolyte.

Iwamoto et al. teaches a solid electrolyte for a lithium battery (col. 1, lines 15-20; col. 2, lines 24-27; col. 13, lines 2-5) that is a lithium ion conductive glass solid electrolyte having a distinguished ion conductivity (col. 2, lines 5-11) and prevent leakage problems due to using liquid electrolytes (col. 1, lines 24-30).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the lithium ion conductive glass solid electrolyte of Iwamoto et al. in the battery of JP 10-092424 A because the glass solid electrolyte has a distinguished ion conductivity and prevents leakage problems due to using liquid electrolytes as taught by Iwamoto et al. (col. 1, lines 24-30).

***Double Patenting***

11. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

12. Claims 1, 3, 11, 13, and 14 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 18 of U.S. Patent No. 6,090,505 in view of Kawakami et al . (US 5,824,434).

Claim 18 of U.S. Patent No. 6,090,505 discloses a nonaqueous electrolyte secondary battery comprising a positive electrode, a negative electrode, and nonaqueous electrolyte, wherein the negative electrode comprises a negative electrode material comprising a composite particle comprising a core formed by a solid phase A and a solid phase B wrapping at least partially the core formed by solid phase A and solid phase A comprises silicon and solid phase B comprises nickel silicides (col. 25, line 63-49). The composite particle comprising solid phase A and solid phase B inherently is capable of intercalating and deintercalating lithium since phase A and phase B both are able to alloy with lithium (col. 26, lines 1-19).

Claim 18 of U.S. Patent No. 6,090,505 does not disclose a polymer gel electrolyte in the battery and that the polymer gel electrolyte comprises polyethylene oxide.

Kawakami et al. teach that a polymer gel electrolyte is used in a nonaqueous electrolyte secondary battery because the use of a polymer gel electrolyte prevents leakage of liquid electrolyte from the battery and that a suitable polymer gel electrolyte comprises polyethylene oxide (see abstract and col. 20, lines 44-50).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a polymer gel electrolyte comprising polyethylene oxide in the nonaqueous electrolyte secondary battery of U.S. Patent No. 6,090,505 because a polymer gel electrolyte comprising polyethylene oxide prevents leakage of liquid electrolyte from the battery.

13. Claims 1, 2, 4, 15, and 17 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 18 of U.S. Patent No. 6,090,505 in view of EP 730316 A1.

Claim 18 of U.S. Patent No. 6,090,505 discloses a nonaqueous electrolyte secondary battery comprising a positive electrode, a negative electrode, and nonaqueous electrolyte, wherein the negative electrode comprises a negative electrode material comprising a composite particle comprising a core formed by a solid phase A and a solid phase B wrapping at least partially the core formed by solid phase A and solid phase A comprises silicon and solid phase B comprises nickel silicides (col. 25, line 63-49). The composite particle comprising solid phase A and solid phase B inherently is capable of intercalating and deintercalating lithium since phase A and phase B both are able to alloy with lithium (col. 26, lines 1-19).

Claim 18 of U.S. Patent No. 6,090,505 does not disclose that the positive electrode includes a polymer gel electrolyte and the negative electrode includes a polymer gel electrolyte and that the polymer is a polymer of vinylidene fluoride.

EP 730316 A1 teaches polyvinylidene (PVDF) homopolymer or polyvinylidene fluoride (PVDF) copolymer as the solid electrolyte material for a separator and for the positive and negative electrodes of a nonaqueous electrolyte secondary battery with electrolyte material being present in the separator and in the electrodes (see page 13, lines 35-50) because the PVDF provides for a porous structure in the separator and in the electrodes that would increase the utilization of the active material and electrolyte material (see page 5, lines 24-29) due to

enhanced electrolyte mobility from the porous structure. The PVDF copolymer can be copolymers of vinylidene fluoride and hexafluoropropylene (see page 4, lines 30-35).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use PVDF homopolymer gel electrolyte or PVDF-HFP copolymer gel electrolyte as the polymer gel electrolyte in the battery of U.S. Patent No. 6,090,505 because the PVDF homopolymer gel electrolyte or PVDF-HFP copolymer gel electrolyte are stable and compatible in a nonaqueous secondary battery environment and are conventionally used in the art. The use of these polymer gel electrolytes in the separator and in the electrodes also gives increased efficiency in the battery due to the porous structure of the polymer as taught by EP 730316 A1.

Furthermore, it would have also been obvious to one of ordinary skill in the art at the time the invention was made to use the polymer gel electrolyte in the electrodes of a nonaqueous electrolyte secondary battery because the use of the same polymer matrix in the electrode and in the separator (solid electrolyte) ensures chemical compatibility of the polymer as a binder for the electrodes with the polymer electrolyte.

14. Claims 6, 7, 19, and 20 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 18 of U.S. Patent No. 6,090,505 in view of Kawakami et al . (US 5824434) as applied to claims 1 and 14 above, and further in view of Gies et al. (USP 5,665,265).

Claim 18 of U.S. Patent No. 6,090,505 in combination with Kawakami et al . (US 5824434) (US 5824434) teach all the limitations of claims 6, 7, 19, and 20 except that the polymer gel electrolyte includes a non-woven fabric of a polyolefin polymers, and that the polymer is a copolymer of methacrylate and an ethylene oxide.

Gies et al. teaches a polymer gel electrolyte that includes a non-woven fabric of polyolefin polymers (col. 3, lines 18-60) and that the polymer gel electrolyte can be polyethylene oxide, polymethylmethacrylate and copolymers thereof.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a polymer gel electrolyte include a non-woven fabric of polyolefin polymers for good mechanical integrity of the electrolyte as taught by Gies et al. (see col. 2, lines 15-20).

It would have also been obvious to one of ordinary skill in the art at the time the invention was made to use a copolymer of methacrylate and an ethylene oxide as the polymer gel electrolyte in a nonaqueous electrolyte secondary battery because the copolymer is capable of absorbing electrolyte species to form a gel polymer electrolyte and it is functionally equivalent to the polyethylene oxide used in the gel polymer electrolyte of the Kawakami et al. as taught by Gies et al. (col. 3, lines 44-58).

15. Claims 5 and 18 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 18 of U.S. Patent No. 6,090,505 in view of Kawakami et al . (US 5824434) as applied to claims 1 and 14 above, and further in view of St. Aubyn Hubbard et al. (USP 5,460,903).

Claim 18 of U.S. Patent No. 6,090,505 in combination with Kawakami et al . (US 5824434) (US 5824434) teach all the limitations of claims 5 and 18 except that the polymer in the polymer gel electrolyte is a polyester polymer.

St. Aubyn Hubbard et al. teaches a polymer gel electrolyte comprising polyester polymer for a nonaqueous electrolyte secondary battery (see abstract; col.2, lines 33-45; col. 3, lines 1-15,

lines 35-41 and lines 65-67) because polymer gel electrolytes containing polyester as the polymer provides for mechanical rigidity.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use polyester as the polymer in the polymer gel electrolyte in the battery of U.S. Patent No. 6,090,505 because polymer gel electrolyte comprising polyester has improved mechanical stability.

16. Claims 8, 9, 14, 21, and 22 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 18 of U.S. Patent No. 6,090,505 in view of Iwamoto et al. (USP 5,589,296).

Claim 18 of U.S. Patent No. 6,090,505 discloses a nonaqueous electrolyte secondary battery comprising a positive electrode, a negative electrode, and nonaqueous electrolyte, wherein the negative electrode comprises a negative electrode material comprising a composite particle comprising a core formed by a solid phase A and a solid phase B wrapping at least partially the core formed by solid phase A and solid phase A comprises silicon and solid phase B comprises nickel silicides (col. 25, line 63-49). The composite particle comprising solid phase A and solid phase B inherently is capable of intercalating and deintercalating lithium since phase A and phase B both are able to alloy with lithium (col. 26, lines 1-19).

Claim 18 of U.S. Patent No. 6,090,505 does not disclose using a lithium ion conductive glass solid electrolyte instead of a separator and that the glass solid electrolyte is synthesized with row materials including a first component including at least a lithium sulfide, a second component including at least one of a silicon sulfide, a phosphor sulfide, and a boron sulfide, and

a third component including at least one of lithium phosphate, lithium sulfate, lithium borate, and lithium silicate.

Iwamoto et al. teaches a solid electrolyte for a nonaqueous electrolyte secondary battery (col. 1, lines 15-20; col. 2, lines 24-27; col. 13, lines 2-5) that is a lithium ion conductive glass solid electrolyte and that the glass solid electrolyte is synthesized with row materials including (see col. 2, lines 51-60) a first component including at least a lithium sulfide, a second component including at least one of a silicon disulfide (a silicon sulfide), diphosphorous pentasulfide (a phosphor sulfide), and a boron sulfide; and a third component including at least one of lithium phosphate, lithium sulfate, and lithium silicate (which is lithium orthosilicate) to give a solid electrolyte having a distinguished ion conductivity (col. 2, lines 5-11) and prevent leakage problems due to using liquid electrolytes (col. 1, lines 24-30).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the lithium ion conductive glass solid electrolyte of Iwamoto et al. that is synthesized with row materials including a first component including at least a lithium sulfide, a second component including at least one of a silicon disulfide (a silicon sulfide), diphosphorous pentasulfide (a phosphor sulfide), and a boron sulfide; and a third component including at least one of lithium phosphate, lithium sulfate, and lithium silicate (which is lithium orthosilicate) in the nonaqueous electrolyte secondary battery of U.S. Patent No. 6,090,505 because the glass solid electrolyte has a distinguished ion conductivity and prevents leakage problems due to using liquid electrolytes as taught by Iwamoto et al. (col. 1, lines 24-30).

17. Claims 1, 3, and 11-14 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 26, 27, 29, 32, 33, and 34 of U.S. Patent No. 6,605,386 B1 in view of Kawakami et al . (US 5,824,434).

Claims 1, 26, 27, 29, 32, 33, and 34 of U.S. Patent No. 6,605,386 B1 all the limitations of claims 1, 3, and 11-14 except a polymer gel electrolyte in the nonaqueous secondary battery and that the polymer gel electrolyte comprises polyethylene oxide.

Kawakami et al. teach that a polymer gel electrolyte is used in a nonaqueous electrolyte secondary battery because the use of a polymer gel electrolyte prevents leakage of liquid electrolyte from the battery and that a suitable polymer gel electrolyte comprises polyethylene oxide (see abstract and col. 20, lines 44-50).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a polymer gel electrolyte comprising polyethylene oxide in the nonaqueous electrolyte secondary battery of U.S. Patent No. 6,605,386 B1 because a polymer gel electrolyte comprising polyethylene oxide prevents leakage of liquid electrolyte from the battery.

18. Claims 8, 9, 14, 21, and 22 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 26, 27, 29, 32, 33, and 34 of U.S. Patent No. 6,605,386 B1 in view of Iwamoto et al. (USP 5,589,296).

Claims 1, 26, 27, 29, 32, 33, and 34 of U.S. Patent No. 6,605,386 B1 discloses all the limitations of claims 8, 9, 14, 21, and 22 except using a lithium ion conductive glass solid

electrolyte instead of a separator and that the glass solid electrolyte is synthesized with row materials including a first component including at least a lithium sulfide, a second component including at least one of a silicon sulfide, a phosphor sulfide, and a boron sulfide, and a third component including at least one of lithium phosphate, lithium sulfate, lithium borate, and lithium silicate.

Iwamoto et al. teaches a solid electrolyte for a nonaqueous electrolyte secondary battery (col. 1, lines 15-20; col. 2, lines 24-27; col. 13, lines 2-5) that is a lithium ion conductive glass solid electrolyte and that the glass solid electrolyte is synthesized with row materials including (see col. 2, lines 51-60) a first component including at least a lithium sulfide, a second component including at least one of a silicon disulfide (a silicon sulfide), diphosphorous pentasulfide (a phosphor sulfide), and a boron sulfide; and a third component including at least one of lithium phosphate, lithium sulfate, and lithium silicate (which is lithium orthosilicate) to give a solid electrolyte having a distinguished ion conductivity (col. 2, lines 5-11) and prevent leakage problems due to using liquid electrolytes (col. 1, lines 24-30).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the lithium ion conductive glass solid electrolyte of Iwamoto et al. that is synthesized with row materials including a first component including at least a lithium sulfide, a second component including at least one of a silicon disulfide (a silicon sulfide), diphosphorous pentasulfide (a phosphor sulfide), and a boron sulfide; and a third component including at least one of lithium phosphate, lithium sulfate, and lithium silicate (which is lithium orthosilicate) in the nonaqueous electrolyte secondary battery of U.S. Patent No. 6,605,386 B1 because the glass

solid electrolyte has a distinguished ion conductivity and prevents leakage problems due to using liquid electrolytes as taught by Iwamoto et al. (col. 1, lines 24-30).

***Conclusion***

Any inquiry concerning this communication or earlier communications should be directed to examiner Susy Tsang-Foster, Ph.D. whose telephone number is (703) 305-0588. The examiner can normally be reached on Monday through Friday from 9:30 AM to 7:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at (703) 308-2383. The phone number for the organization where this application or proceeding is assigned is (703) 305-5900.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

st/ Susy Tsang-Foster

Susy Tsang-Foster
Primary Examiner
Art Unit 1745